



# LM317A

## LINEAR INTEGRATED CIRCUIT

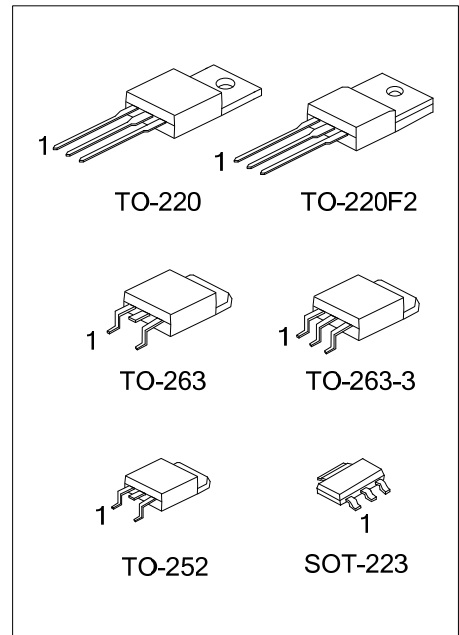
### MEDIUM CURRENT 1.2V TO 37V ADJUSTABLE VOLTAGE REGULATOR

#### DESCRIPTION

The UTC **LM317A** is an adjustable 3-terminal positive voltage regulator, designed to supply 1.5A of output current with voltage adjustable from 1.2V ~ 37V.

#### FEATURES

- \* Output voltage adjustable from 1.2V ~ 37V
- \* Output current in excess of 1.5A
- \* Internal thermal overload protection
- \* Internal short circuit current limiting
- \* Output transistor safe area compensation



#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
-	LM317AG-AA3-R	SOT-223	ADJ	O	I	Tape Reel
LM317AL-TA3-T	LM317AG-TA3-T	TO-220	ADJ	O	I	Tube
LM317AL-TF2-T	LM317AG-TF2-T	TO-220F2	ADJ	O	I	Tube
LM317AL-TN3-R	LM317AG-TN3-R	TO-252	ADJ	O	I	Tape Reel
LM317AL-TQ2-R	LM317AG-TQ2-R	TO-263	ADJ	O	I	Tape Reel
LM317AL-TQ2-T	LM317AG-TQ2-T	TO-263	ADJ	O	I	Tube
LM317AL-TQ3-R	LM317AG-TQ3-R	TO-263-3	ADJ	O	I	Tape Reel
LM317AL-TQ3-T	LM317AG-TQ3-T	TO-263-3	ADJ	O	I	Tube

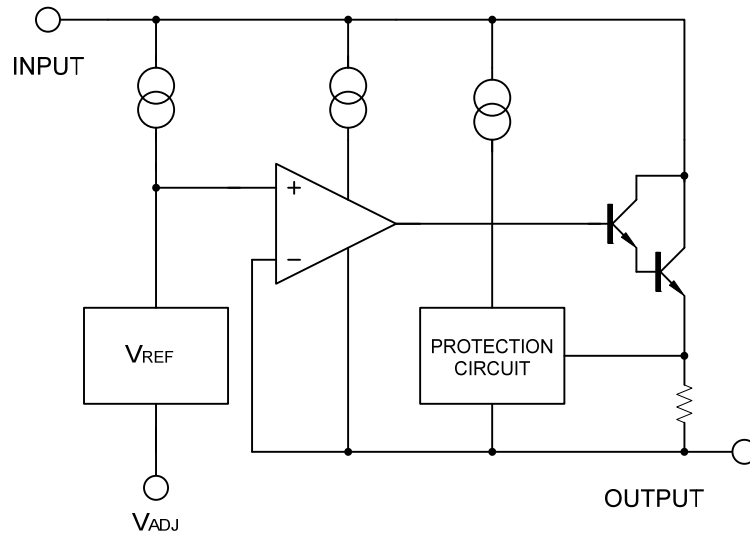
Note: Pin Assignment: I:  $V_{IN}$  O:  $V_{OUT}$

<p>LM317AG-AA3-R</p>	<p>(1) R: Tape Reel, T: Tube                  (2) AA3: SOT-223, TA3: TO-220, TF2: TO-220F2                  TN3: TO-252, TQ2: TO-263, TQ3: TO-263-3                  (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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#### MARKING

SOT-223	TO-220 / TO-220F2 / TO-252 / TO-263 / TO-263-3

### ■ BLOCK DIAGRAM



### ■ ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	RATINGS	UNIT
Input-Output Voltage Differential	$V_{IN}-V_{OUT}$	40	V
Power Dissipation	$P_D$	Internally limited	
Junction Temperature	$T_J$	+125	°C
Operating Temperature	$T_{OPR}$	-40 ~ +85	°C
Storage Temperature	$T_{STG}$	-65 ~ +150	°C

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

### ■ THERMAL DATA

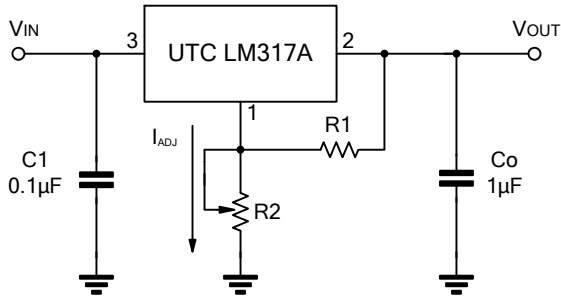
PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-223	$\theta_{JA}$	140	°C/W
	TO-220/TO-220F2		50	°C/W
	TO-252		103	°C/W
	TO-263/TO-263-3		62.5	°C/W
Junction to Case	SOT-223	$\theta_{JC}$	23.5	°C/W
	TO-220/TO-263		5	°C/W
	TO-263-3		8	°C/W
	TO-220F2		12	°C/W

### ■ ELECTRICAL CHARACTERISTICS

( $V_{IN}-V_{OUT}=5V$ ,  $I_{OUT}=0.5A$ ,  $P_{MAX}=20W$ ,  $T_A=25^\circ C$ , unless otherwise specified.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
Line Regulation	$\Delta V_{OUT}/V_{OUT}$	$3V \leq V_{IN}-V_{OUT} \leq 40V$ , $I_{OUT}=100mA$		0.01	0.04	%/V	
Load Regulation	$\Delta V_{OUT}$	$10mA \leq I_{OUT} \leq 1.5A$	$V_{OUT} \leq 5V$	5	25	mV	
			$V_{OUT} \geq 5V$	0.1	0.5	%	
Adjustable Pin Current	$I_{ADJ}$			50	100	$\mu A$	
Adjustable Pin Current Change	$\Delta I_{ADJ}$	$3V \leq V_{IN}-V_{OUT} \leq 40V$ , $10mA \leq I_{OUT} \leq 500mA$		0.2	5	$\mu A$	
Reference Voltage	$V_{REF}$	$3V \leq V_{IN}-V_{OUT} \leq 40V$ , $10mA \leq I_{OUT} \leq 1.5A$ , $P_D < P_{MAX}$	1.20	1.25	1.30	V	
Temperature Stability		$T_{MIN} \leq T_J \leq T_{MAX}$		0.7		%/V <sub>OUT</sub>	
Minimum Load Current for Regulation	$I_{L(MIN)}$	$V_{IN}-V_{OUT}=40V$			4.5	mA	
Maximum Output Current	$I_{O(MAX)}$	$V_{IN}-V_{OUT}=40V$ , $P_D \leq P_{MAX}$	0.3	0.4		A	
		$V_{IN}-V_{OUT}=15V$ , $P_D < P_{MAX}$	1.5	2.2		A	
RMS Noise vs. %of $V_{OUT}$	eN	$10Hz \leq f \leq 10KHz$		0.003		%/V <sub>OUT</sub>	
Ripple Rejection	RR	$V_{OUT}=10V$ , $f=120Hz$	$C_{ADJ}=0$		65		dB
			$C_{ADJ}=10\mu F$	66	80		dB

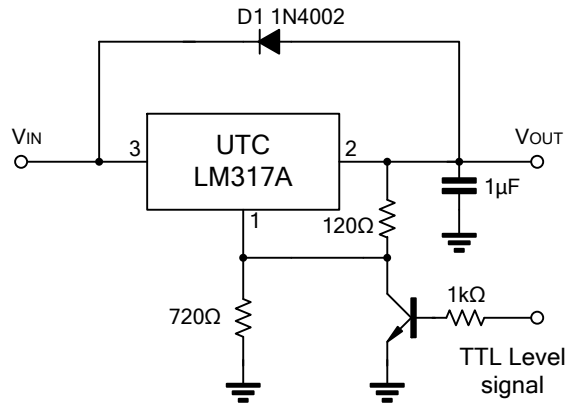
## APPLICATION CIRCUITS



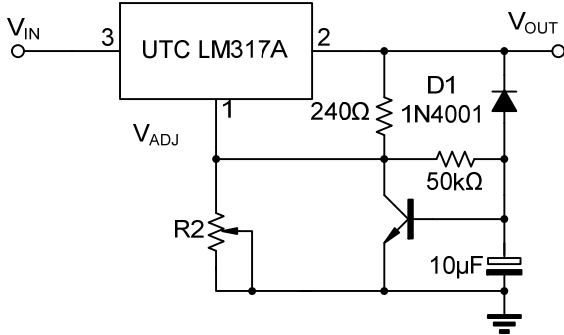
$$V_{OUT} = 1.25V \times (1 + R2/R1) + I_{ADJ} \times R2$$

C1 is required when regulator is located an appreciated distance from power supply. Co is needed to improve transient response.

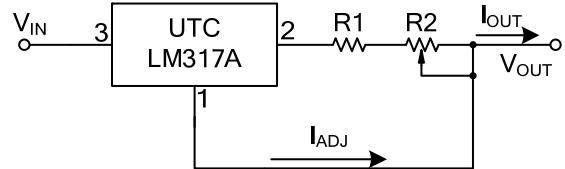
**Fig.1 Programmable voltage regulator**



**Fig.2 Regulator with On-off control**



**Fig.3 Soft Start Application**

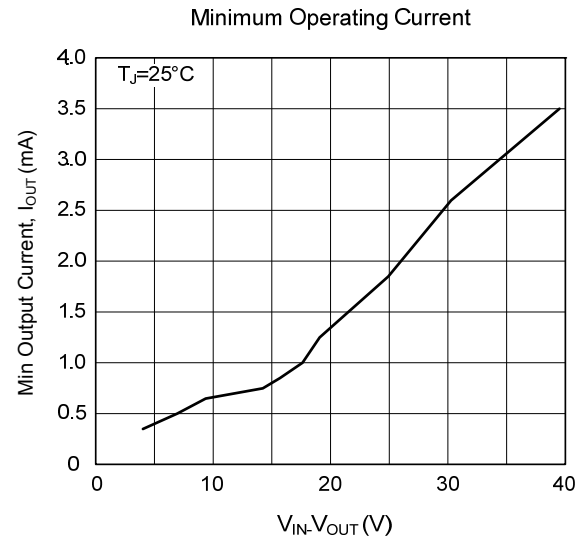
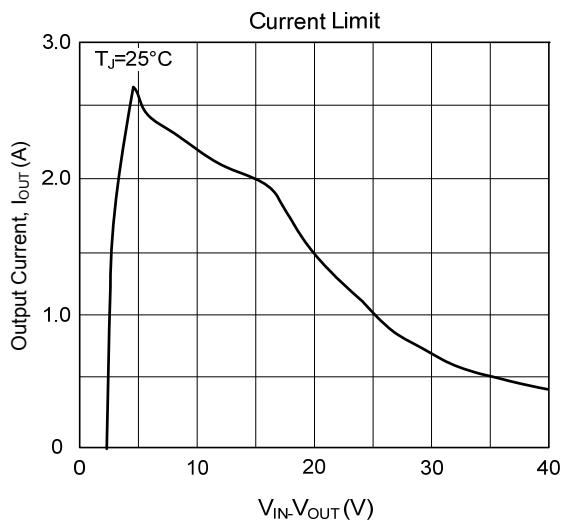
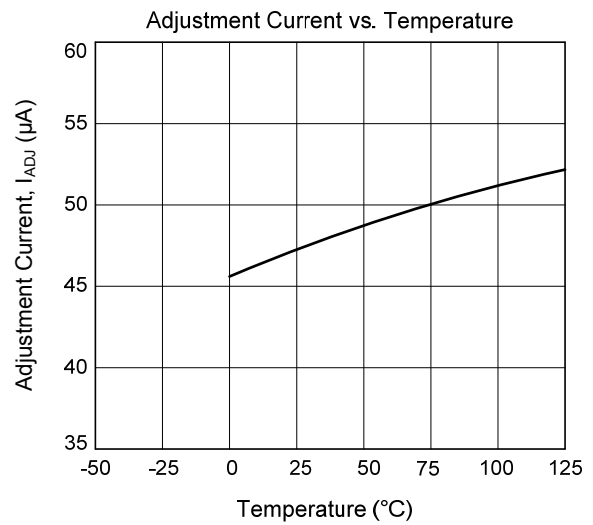
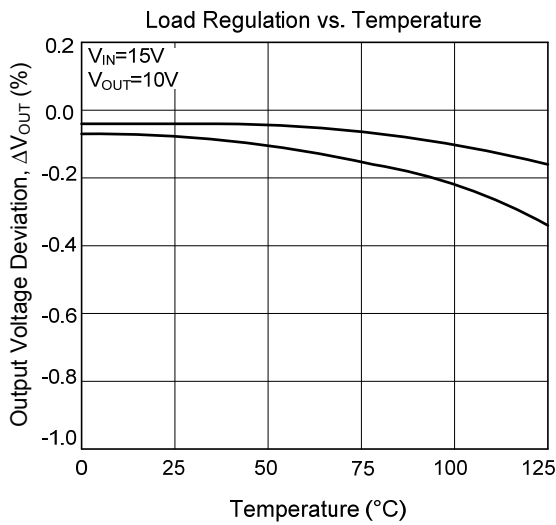


**Fig.4 Constant Current Application**

$$I_{O(MAX)} = \left( \frac{V_{REF}}{R1} \right) + I_{ADJ} = \frac{1.25V}{R1}$$

$$I_{O(MIN)} = \left( \frac{V_{REF}}{R1+R2} \right) + I_{ADJ} = \frac{1.25V}{R1+R2}$$

### TYPICAL CHARACTERISTICS



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